

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Cave Springs Branch

Water Body Segment at a Glance:

County:	McDonald
Nearby Cities:	South West City
Length of impairment:	0.2 miles
Pollutant:	Nutrients
Source:	Simmons Industries
Water Body ID:	3245U-01



Scheduled for TMDL Development: Approved by EPA 2010

Description of the Problem

Designated Beneficial uses of Cave Springs Branch

- This stream is not classified, so no designated beneficial uses are assigned to it; however, all waterbodies in Missouri are protected by the general criteria contained in Missouri's Water Quality Standards (WQS), 10 CSR 20-7.031.

Use that is impaired

- None, since no designated beneficial uses can be assigned.

Standards that apply

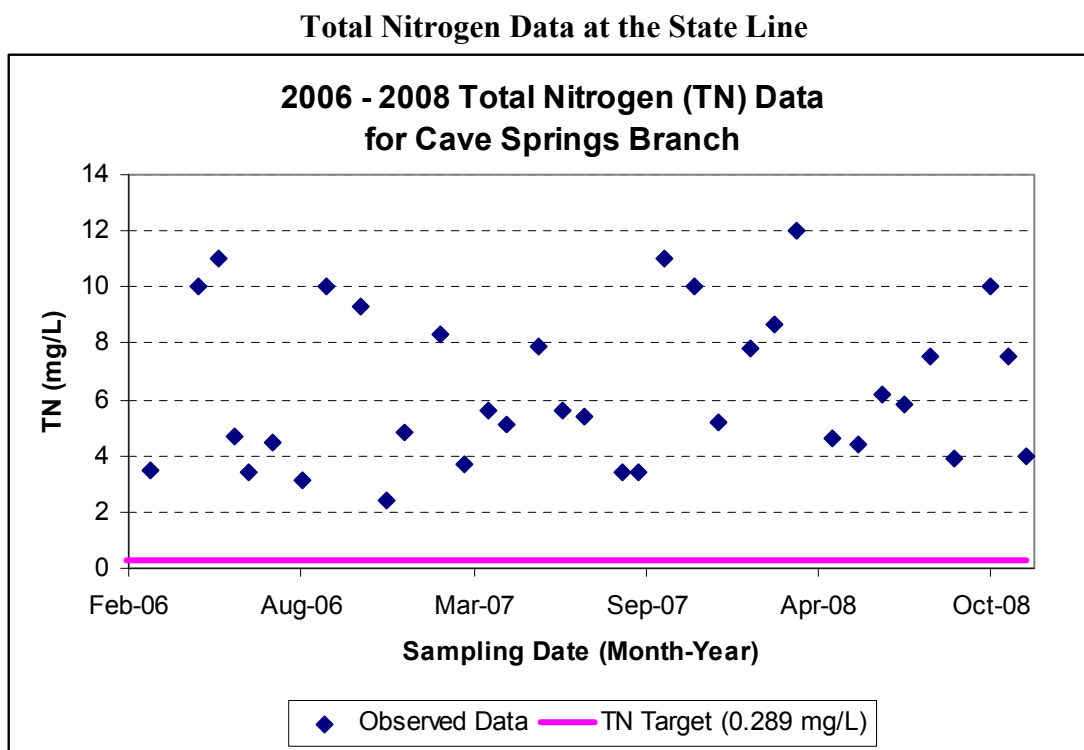
- Missouri does not yet have numeric nutrient criteria for streams and rivers, so the general (narrative) criteria are used. The general criteria that apply to Cave Springs Branch are found in Missouri's Water Quality Standards at 10 CSR 20-7.031 (3):
 - (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - (B) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
 - (G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background information and water quality data

Cave Springs Branch is in the far southwest corner of Missouri and flows into Oklahoma. Throughout much of the 1990s, the stream suffered several episodes of very poor water quality due to malfunctions of the wastewater treatment facilities at the Simmons poultry processing plant. Of particular concern

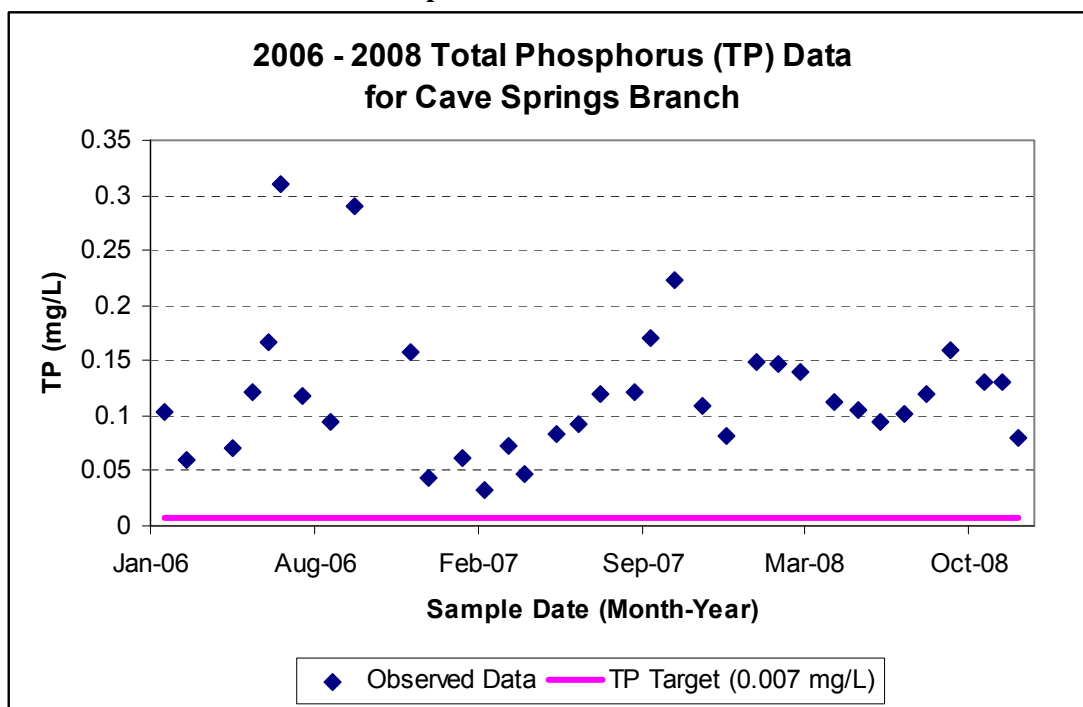
were occasional acutely toxic levels of ammonia¹ during times of treatment plant malfunction. Also, chronic problems with high levels of nitrogen and phosphorus stimulated excessive algae growth in Cave Springs Branch. By 1999, improvements to the wastewater treatment facilities had improved water quality in the branch. However, the combination of nutrient discharges from this facility and nutrients reaching the creek due to the leaking lagoons at the Simmons' facility were still responsible for abnormally high levels of nutrients in Cave Springs Branch. Elevated levels of nutrients can stimulate excess production of benthic (bottom growing) algae, which in turn can adversely affect fish and other aquatic animals in the stream by reducing spawning grounds and nursery habitats, and causing low levels of dissolved oxygen. The worst water quality problems in Cave Springs Branch occurred prior to 1998, when total nitrogen levels were over 100 milligrams per liter, or mg/L (which is the same as parts per million), and total phosphorus levels were over 10 mg/L. Data collected by the department and Oklahoma since that time show reductions in the levels of nitrogen and phosphorus in Cave Springs Branch beginning in late 1999.

Since Missouri does not yet have numeric nutrient criteria for streams, the TMDL for Cave Springs Branch targeted the U.S. Environmental Protection Agency, or EPA, nutrient ecoregion reference concentrations for the Ozark Highlands (Level III 39). These concentrations are 0.289 mg/L total nitrogen and 0.007 mg/L total phosphorus. To calculate the TMDL, data from the U.S. Geological Survey, or USGS, gaging station on Cave Springs Branch at the state line were used. The data collected by the department and Oklahoma were not used because those data do not have flow data associated with them. Flow is needed to create the load duration curves that the TMDL is based on. Graphs of the USGS data from 2006 to 2008 are below. Note that while the data are above the TMDL targets (dashed lines), they are considerably lower than the highs in 1998 mentioned above.



¹ Ammonia is one of three “species” of nitrogen that make up total nitrogen. Its chemical formula is NH₃.

Total Phosphorus Data at the State Line

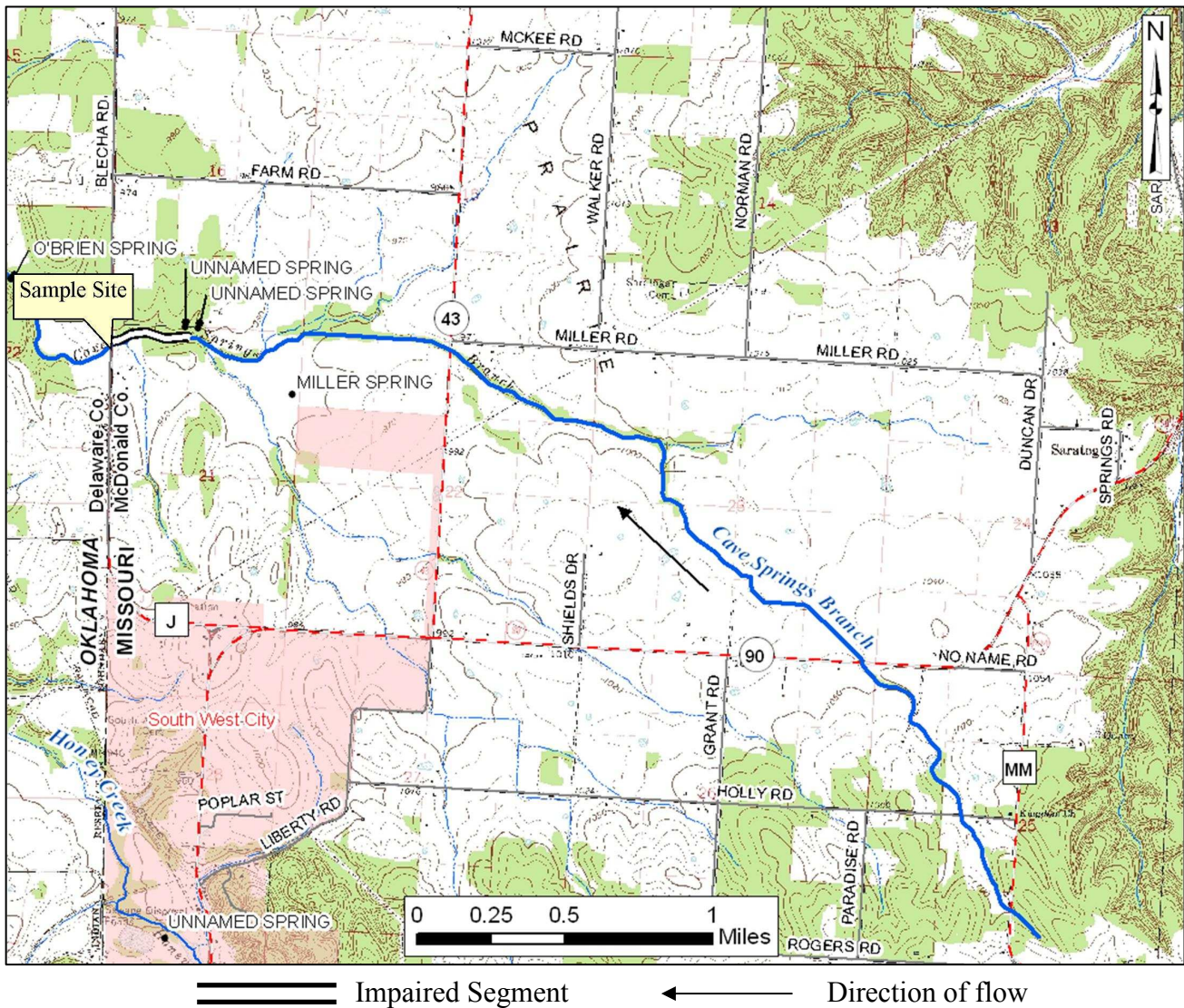


It should be noted that the TMDL targets are subject to change. When Missouri's numeric nutrient criteria are developed, or a TMDL for downstream waters is approved (e.g., any future TMDL for Grand Lake O' the Cherokees in Oklahoma, which will include nutrient allocations for Missouri), the targets in this TMDL will be reviewed and revised, as appropriate, and reflect any site-specific or downstream requirements.

EPA approved the Cave Springs Branch TMDL for nutrients Dec. 6, 2010.

A map of Cave Springs Branch in Missouri, showing the impaired segment and sampling site, is on the next page.

Map Showing Cave Springs Branch in McDonald County, Mo., and USGS Sampling Site



For more information call or write:

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